

PATENT APPLICATION TRANSMITTAL LETTER

Docket Number (Optional)

402-038-19

To the Commissioner of Patents and Trademarks:

Transmitted herewith for filing under 35 U.S.C. 111 and 37 CFR 1.53 is the patent application of

David G. McCarthy
 entitled Retractable Receptacle For Furniture

Enclosed are:

21 pages of written description, claims and abstract.
 2 sheets of drawings. (Figs. 1 - 2)
 an assignment of the invention to _____
 executed declaration of the inventors.
 a certified copy of a _____ application.
 associate power of attorney.
 a verified statement to establish small entity status under 37 CFR 1.9 and 1.27.
 information disclosure statement
 preliminary amendment
 other: Express Mail Certificate

CLAIMS AS FILED

	NUMBER FILED	NUMBER EXTRA	RATE	FEE
BASIC FEE			\$	\$
TOTAL CLAIMS	20 - 20 =	—	x \$	—
INDEPENDENT CLAIMS	3 - 3 =	—	x \$	—
MULTIPLE DEPENDENT CLAIM PRESENT			\$220	—
* NUMBER EXTRA MUST BE ZERO OR LARGER			TOTAL	\$ 790.00
If applicant has small entity status under 37 CFR 1.9 and 1.27, then divide total fee by 2, and enter amount here.				\$ 395.00

A check in the amount of \$ 395.00 to cover the filing fee is enclosed.

The Commissioner is hereby authorized to charge and credit Deposit Account No. _____ as described below. I have enclosed a duplicate copy of this sheet.

Charge the amount of \$ _____ as filing fee.
 Credit any overpayment.
 Charge any additional filing fees required under 37 CFR 1.16 and 1.17.
 Charge the issue fee set in 37 CFR 1.18 at the mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).

10/16/97

Date

Mark P. Stone

Signature

Mark P. Stone, Reg. No. 27,954

Typed or printed name

1100 Ridge Road

Address

Stamford, Connecticut 06905

UNITED STATES PATENT APPLICATION

FOR:

RETRACTABLE RECEPTACLE FOR FURNITURE

INVENTOR:

DAVID G. McCARTHY

ABSTRACT OF THE DISCLOSURE

A receptacle for coupling electrical equipment and communications equipment to electrical and communications transmission lines is retractably mounted in an opening in a furniture unit, and in particular, the top surface of an office conference table. The receptacle is vertically displaceable so that it is elevated above the top surface of the furniture unit in which it is mounted to provide access for coupling electrical equipment such as lap top computers, or communications equipment such as telephones and fax machines, which are supported on the top surface of the furniture unit. When the equipment is coupled to the elevated receptacle unit, the unit is then displaced downwardly into the furniture such that the top surface of the receptacle unit is planar with the top surface of the furniture unit in its fully retracted position. A gap defined between the outer surface of the top surface of the receptacle unit and the inner surface of the opening in the furniture unit permits wires and cables to extend through the gap and remain connected to the receptacle unit when the receptacle unit is in its fully retracted position in the furniture unit. The receptacle unit may be displaced into its elevated position to disconnect lines coupled to it or to connect additional lines. In this manner, portable electrical and communications equipment can be supported or stored on furniture units, such as conference tables, and

actuated when needed by coupling the equipment to the receptacle in the furniture unit.

BACKGROUND OF THE INVENTION

The present invention is directed to a furniture system, and in particular an office furniture system, including means for readily and conveniently coupling portable electrical, electronic and communications equipment to appropriate electrical and communications lines. The portable equipment adapted to be used in conjunction with the system of the present invention includes computers, facsimile machines, telephones, and lighting equipment, among other things.

United States Patent No. 5,231,562, entitled "Desk Top Wire Management Apparatus" exemplifies a known receptacle device installed in an opening on a desktop for coupling plugs of different equipment to be used on the desk, such as calculators, computers, and telephones. The apparatus disclosed by this patent includes a housing mounted within an opening in the top surface of a furniture unit, as for example in a desk top, and a cover pivotably mounted to the top of the housing. The underside of the cover includes a plurality of individual electrical receptacles which are exposed when the cover is pivoted into its opened position and extends upwardly in a substantial perpendicular orientation relative to the desktop surface. In this extended position, plugs from the portable equipment on the desk top are coupled to the individual receptacles on the underside of the cover. The receptacles in the cover are themselves coupled to a source of electrical power for energizing

the equipment plugged into the cover. The housing mounted in the opening in the desktop also includes a pivotable wall for providing access to outlet assemblies or wiring modules contained within the housing. Since the housing is mounted beneath the top surface of the desk, access to the outlet assemblies or wiring modules within the housing is only available through the pivoted wall beneath the desktop surface.

The device disclosed by U.S. Patent No. 5,231,562 is complicated in that: it requires a housing have both a pivotable top cover and a pivotable wall; access to the interior of the housing is only available through the underside of the desktop to which the unit is mounted; and the pivotable cover, in its opened position, does not provide equal access to the individual electrical receptacles at different locations along the desktop surface. It is the primary object of the present invention to provide a furniture system having retractable receptacle means overcoming the disadvantages of the known systems such as that exemplified by United States Patent No. 5,231,562.

SUMMARY OF THE INVENTION

A furniture system includes a receptacle unit displacably mounted within an opening defined in the top surface of the furniture unit. The receptacle unit includes individual receptacles to selectively receiving electrical plugs and other connectors for coupling portable electronic, electrical and communications equipment supported on the top surface of the furniture unit. Such equipment includes, but is not limited to, computers, calculators, telephones, facsimile machines, electronic screens, and lighting fixtures. The receptacle unit is selectively displaceable between an elevated position in which the individual receptacles are elevated above the top surface of the furniture unit to provide ready access for coupling and uncoupling plugs and other connectors to the individual receptacles, and a fully retracted position in which the top surface of the receptacle unit is substantially planar with the top of the furniture unit to provide a substantially continuous top surface. A slight gap or space is defined between the outer perimeter of the top surface of the receptacle unit and the inner perimeter of the opening in the top surface of the furniture unit to permit electrical cords or other wires to extend through the gap. In this manner, electrical wires or other connectors coupled to the receptacle unit in its elevated position are received in and extend through the gap when the receptacle unit is displaced into its retracted position in the opening in the furniture unit.

In the preferred embodiments of the invention, a brush extends across the gap between the receptacle unit in its retracted position and the top surface of the furniture unit to prevent small materials or objects on the top surface of the furniture unit from falling into the gap space. The receptacle unit is generally symmetrical in configuration so as to provide equal access from different locations along the top surface of the furniture unit. If the furniture unit is a square or rectangular conference table, the receptacle unit is preferably square or rectangular in shape to provide individual receptacles facing all four sides of the table for providing ready access from any location around the table. A housing for receiving the receptacle unit in its retracted position is fixedly mounted to the underside of the surface of the furniture unit, and the housing has an opened top which is aligned with the opening defined in the top surface of the furniture unit. The housing includes an opening therein for receiving one or more cords or lines for coupling the receptacle unit to an external source of electrical power or to external communication lines. Preferably, the receptacle unit is spring biased in a direction urging it into its extended elevated position, and releasable locking means are provided for selectively retaining the receptacle unit in its fully retracted position in the opening in the top surface of the furniture unit.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of a first embodiment of a furniture system in accordance with the present invention; and

FIGURE 2 is a perspective view of a second embodiment of a furniture system in accordance with the present invention.

**DESCRIPTION OF THE BEST MODES
FOR CARRYING OUT THE INVENTION**

Figures 1 and 2 illustrate the preferred embodiments of the improved furniture system in accordance with the present invention.

A furniture unit designated generally by the reference numeral 2 represents a conference table having a generally rectangular shape table top 4 supported by four corner legs 6. The table top 4 defines an upper surface generally designated by the reference numeral 8, and an undersurface generally designated by the reference numeral 10. Two generally square shaped openings, each designated by the reference numeral 12, are defined in the top surface 8 of the table 2. A computer, designated by reference numeral 14, and a telephone, designated by reference numeral 16, are supported on the top surface of the table. A power line for the computer 14 is generally designated by reference numeral 18, and a cord for the telephone 16 is generally designated by reference numeral 20.

A receptacle unit generally designated by reference numeral 22 is shown in its extended position, vertically displaced and elevated above the top surface 8 of the table 2. The receptacle unit 22 includes a top surface 24 which is formed from the same material as the top surface 8 of the table, and four sidewalls

26, each defining a plurality of individual receptacles 32 for receiving electrical plugs from electrical equipment on the tabletop, or for receiving connectors from other equipment on the tabletop, as for example, communications lines, fiber optic transmission lines, and other lines for transmitting signals or data.

FIGURE 1 also illustrates a second receptacle unit 22, positioned at the opposed side of the table 2 (illustrated to the left in the drawing figure). In its fully retracted position in the opening 12 defined in the top surface 8 of the table, the top 24 of the retracted receptacle unit 22 is substantially co-planar with the top surface 8 of the table to provide a continuous surface. A gap or space 28 is defined between the outer surface of the receptacle unit top 24 and the inner surface of the opening 12 in which the receptacle unit is received in its fully retracted position. In this manner, a cord or line 18, coupling the computer 14 with a receptacle 32 in the retracted receptacle unit 22, extends through the gap 28 (as shown at the location designated by reference numeral 30) when the receptacle unit 22 is in its fully retracted position. Preferably, a brush or other screenlike material extends over the square shaped gap space 28 to prevent small articles from falling into the gap space when the receptacle unit 22 is in its fully retracted position. The brush or screen may be mounted to the inner surface of the opening 12 in the table top 8 or may be mounted to the outer periphery of the top 24 of the receptacle unit 22.

Still referring to Figure 1, the sidewalls 26 of the receptacle unit 22 are recessed inwardly from the respective sides of the top surface 24. In this manner, clearance is provided for the plug portions of electrical cords or other transmission lines received in the individual receptacles 32 on the sidewalls 26 so that the plugs do not obstruct downward displacement of the receptacle unit 22 when it is moved into its retracted position within the opening 12 in the table top 8. As noted above, the gap space 28 defined between the table top 8 and the top surface 24 when the receptacle unit 22 is in its fully retracted position, is of sufficient width to accommodate an electrical or transmission cord or line 18. The top surface 24 of each receptacle unit 22 is of substantially the same configuration and dimension as the opening 12 in the table top 8, and is formed from the same material as the table top 8, so that a substantially smooth, planar, continuous table top surface is provided when the receptacle unit is in its fully retracted position.

A housing (not shown in the drawings) fixedly mounted to the underside 10 table top 4 has an opened top surface corresponding to the dimensions and configuration of the top surface 24 of each receptacle 22. The housing also has a depth which is substantially equal to the elevational height of each receptacle 22 so as to completely receive the receptacle unit 22 in the housing when the receptacle is in its fully retracted position. The housing includes an opening therein for providing access for

transmission lines for coupling the receptacle 22 (and the individual receptacles 32 therein) to external power sources including electrical power lines and communication transmission lines. The housing protects the receptacle unit 22 when it is displaced into its fully retracted position. The receptacle unit 22 and the housing mounted to the underside of the table also include conventional means for resiliently biasing the receptacle unit into its extended elevated position, and releasable locking means for selectively retaining the receptacle unit in its fully retracted position. Accordingly, when the receptacle unit is in its fully elevated position, a downward force opposing the upward resilient bias is applied to displace the receptacle unit in a downward direction towards the top surface 8 of the table. When the receptacle is displaced into its fully retracted position in which its top surface 24 is level with the top surface 8 of the table, the locking means are actuated to releasably lock the receptacle in its retracted position. The locking means are selectively releasable (as for example, applying and releasing a downward force on the top 24 of the receptacle unit 22), to permit the resilient bias to displace the receptacle unit 22 into its fully elevated extended position. Resilient biasing means and cooperating releasable locking means are well known to the art, and any such conventional means may be employed in the present invention.

Figure 2 illustrates a second embodiment in accordance with the present invention. The same reference numerals have been

used in Figure 2 to designate common elements illustrated in Figure 1. Figure 2 illustrates a table 2 having a single receptacle unit 22 received in a single opening 12 defined in the top surface 8 of the table top 4. The receptacle unit 22 is illustrated in its extended elevated position, and two computers 14 and one telephone 16 are coupled respectively by lines 18 and 20 into individual receptacles 32 defined in sidewalls 26 of the receptacle unit 22. While the configuration of the receptacle units 22 illustrated in Figure 1 are square, the receptacle unit 22 illustrated in Figure 2 is generally rectangular in shape.

The four sides 26 of the receptacle units 22 illustrated in both Figures 1 and 2 correspond to the four sides of the table 2 illustrated in Figures 1 and 2. In this manner, the sides 26 carrying the individual receptacles 32 face towards all four sides of the table 2, thereby providing convenient access to the individual receptacles 32 from each of the four sides of the table 2. As discussed with respect to the embodiment of the invention illustrated in Figure 1, the embodiment illustrated by Figure 2 also includes a housing (not shown) fixedly mounted beneath the underside 10 of the table top 4, and cooperating releasable locking means and resilient biasing means for selectively and releasably locking the receptacle unit into its fully retracted position received in the opening 12 in the table top 4. In the fully retracted position of the receptacle unit 22, the top surface 24 thereof is planar with the top surface 8

of the table 2 and is formed from the same material as the table top to provide a substantially continuous top surface.

As also discussed with respect to Figure 1, the Figure 2 embodiment defines a gap space around the outer surface of the top 24 of the receptacle unit 22 when the receptacle unit is in its fully retracted position so that wires or cords connected to the individual receptacles 32 are passed through the gap space. A screen or brush material can be provided over the gap space between the top 24 of the receptacle unit 22 in its retracted position and the inner surface of the opening 12 in the table top 8 to prevent small objects (for example papers clips or pens and pencils) from falling through the gap space.

In operation, the receptacle unit 22 is moved into its extended elevated position, in which the individual receptacles 32 are exposed and completely accessible to persons seated around the table 2. Portable equipment, as for example, computers, telephones, fax machines, calculators and the like, are coupled to the individual receptacles 32. The receptacle unit 22 is then displaced downwardly so that the top surface 24 thereof is flush with the top surface 8 of the table 2. The wires connecting the equipment coupled to the receptacle unit 22 are received in and extend through the gap space defined between the outer surface of the top 24 of the receptacle unit and the inner surface of the opening 12 in the table top when the receptacle unit is displaced into a fully retracted position. Accordingly, substantially the

entire surface of the table top 8 is available for use once the receptacle 22 has been displaced into its fully retracted position. When it is desired to either uncouple equipment from the receptacle unit 22, or to couple additional equipment to the receptacle unit 22, the receptacle unit is displaced into its elevated position by releasing the locking means retaining it in its retracted position. Once the appropriate connection or disconnection has been made, the receptacle unit is again displaced into its fully retracted position to provide a continuous table top surface.

The furniture system in accordance with the present invention is advantageous in many respects over the known system. The system described herein is simple from a mechanical perspective in that it employs only a relatively small number of movable mechanical parts. Essentially, the receptacle unit 22 is selectively displaceable, as a whole, between a fully retracted position and a fully elevated position, thereby eliminating the need to provide pivotably mounted walls or top covers. In the preferred embodiment of the invention, individual receptacles are provided on all sidewalls of the receptacle unit in its elevated position, thereby providing convenient access to the individual receptacles from different locations relative to the furniture unit in which the receptacle 22 is installed. The recessed orientation of the sidewalls (and thus the individual receptacles of the receptacle unit) relative to the periphery of the top surface of the receptacle unit provides protection for the plugs

and other connector elements received in the individual receptacles carried on the sidewalls of the receptacle unit as it is displaced between its extended and retracted position.

Other advantages and modifications within the scope of the present invention will be apparent to those skilled in the art. Accordingly, the preferred embodiments of the invention discussed herein are intended to be illustrative only and not restrictive of the scope of the invention, that scope being defined by the following claims and all equivalents thereto.

CLAIMS

Claim 1. An article of furniture having a top surface and an opening defined in said top surface; a receptacle unit mounted in said opening in said top surface; said receptacle unit comprising a top and at least one sidewall extending downwardly from said top, said at least one sidewall having at least one receptacle defined therein; and means for selectively displacing said receptacle unit between a retracted position in which said top of said receptacle unit is substantially planar with said top surface of said article of furniture, and an extended position in which said at least one receptacle in said at least one sidewall of said receptacle unit is elevated above the top surface of said article of furniture.

Claim 2. The article of furniture as claimed in Claim 1 wherein said receptacle unit is oriented and displaceable in a direction which is substantially perpendicular to the top surface of said article of furniture.

Claim 3. The article of furniture as claimed in Claim 1 further including a plurality of sidewalls, each of said sidewalls having at least one receptacle therein, each of said sidewalls being recessed inwardly relative to the outer surface of the top of said receptacle unit.

Claim 4. The article of furniture as claimed in Claim 1 wherein said top of said receptacle unit and said opening in said top surface of said article of furniture are dimensioned such that a gap space is defined between the outer surface of the top of the receptacle unit and the said top surface of said article of furniture when said receptacle unit is in its retracted position in said opening in said top surface.

Claim 5. The article of furniture as claimed in Claim 4 wherein said gap space is of sufficient dimension to permit a transmission line coupled to said receptacle unit to extend through said gap space when said receptacle unit is in its retracted position in said opening.

Claim 6. The article of furniture as claimed in Claim 1 further including means for resiliently biasing said receptacle unit into said extended position, and cooperating releasable locking means for opposing said means for resiliently biasing for retaining said receptacle unit in said retracted position.

Claim 7. The article of furniture as claimed in Claim 4 further including means for at least partially covering said gap space between said receptacle unit and said top surface of said article of furniture to prevent articles from falling into said gap space when said receptacle unit is in said retracted position.

Claim 8. The article of furniture as claimed in Claim 7 wherein said means for covering includes a brush.

Claim 9. The article of furniture as claimed in Claim 7 wherein said means for covering includes a screen.

Claim 10. The article of furniture as claimed in Claim 7 wherein said means for covering is mounted to said top surface of said article of furniture and extends into said opening defined therein.

Claim 11. The article of furniture as claimed in Claim 7 wherein said means for covering is mounted to said top of said receptacle unit and is carried by said receptacle unit as it is displaced between said extended and retracted positions.

Claim 12. The article of furniture as claimed in Claim 1 wherein said receptacle unit has a plurality of sidewalls, each of said sidewalls carrying at least one receptacle.

Claim 13. The article of furniture as claimed in Claim 12 wherein said receptacle unit has a number of said sidewalls corresponding to the number of sides of said article of furniture, said receptacle unit being oriented relative to said sides of said article of furniture, such that a different sidewall of said receptacle unit faces a different side of said article of furniture.

Claim 14. The article of furniture as claimed in Claim 13 wherein said receptacle unit is generally rectangular shaped.

Claim 15. The article of furniture as claimed in Claim 13 wherein said receptacle unit is generally squared shaped.

Claim 16. An article of furniture having top surface and an opening defined in said top surface; a receptacle unit mounted in said opening in said top surface; said receptacle unit comprising a top and a plurality of sidewalls extending downwardly from said top; each of said sidewalls being recessed inwardly relative to the top of said receptacle unit; and means for selectively displacing said receptacle unit between a retracted position in which said top of said receptacle unit is substantially planar with said top surface of said article of furniture, and an extended position in which at least a portion of each of said plurality of sidewalls of said receptacle unit is elevated above the top surface of said article of furniture.

Claim 17. The article of furniture as claimed in Claim 16 wherein said plurality of sidewalls of said receptacle unit are equal in number to the number of sides of said article of furniture, and said receptacle unit is oriented relative to said article of furniture such that each of said plurality of sidewalls of said receptacle unit faces a different one of said sides of said article of furniture.

Claim 18. The article of furniture as claimed in Claim 16 wherein said receptacle unit and said top surface of said article of furniture are oriented such that a gap is defined between the entire periphery of said receptacle unit and said top surface of said article of furniture when said receptacle unit is in said retracted position received in said opening in said top surface of said article of furniture.

Claim 19. An article of furniture having a top surface and an opening defined in said top surface; a receptacle unit mounted in said opening in said top surface; said receptacle unit comprising a top and at least one sidewall extending downwardly from said top, said at least one sidewall having at least one receptacle defined therein; means for selectively displacing said receptacle unit between a retracted position in which said top of said receptacle unit is substantially planar with said top surface of said article of furniture, and an extended position in which said at least one receptacle in said at least one sidewall of said receptacle unit is elevated above the top surface of said article of furniture; and a housing mounted to an underside of said top surface of said article of furniture, said housing having an open top and being substantially aligned with said opening defined in said top surface of said article of furniture so as to receive said receptacle unit in said housing when said receptacle unit is in said retracted position.

Claim 20. The article of furniture as claimed in Claim 19 wherein said housing includes means for coupling said receptacle unit to an external power source.

DECLARATION FOR PATENT APPLICATION

Docket Number (Optional)

As a below named inventor, I hereby declare that:

402-038-19

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled
Retractable Receptacle For Furniture, the specification of which

is attached hereto unless the following box is checked:

was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

			Priority Claimed
(Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Number) (Filing Date) (Status – patented, pending, abandoned)

(Application Number) (Filing Date) (Status – patented, pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: Mark P. Stone – Reg. No. 27,954

Address all telephone calls to Mark P. Stone at telephone number (203) 329-3355

Address all correspondence to

Mark P. Stone, Esq.

1100 High Ridge Road

Stamford, Connecticut 06905

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor (given name, family name) David G. McCarthy

Inventor's signature David G. McCarthy Date 10-10-97

Residence Huntington, Connecticut Citizenship U.S.A.

Post Office Address 59 Applewood Drive

Huntington, Connecticut 06484

Full name of second joint inventor, if any (given name, family name) _____

Second Inventor's signature _____ Date _____

Residence _____ Citizenship _____

Post Office Address _____

Additional inventors are being named on separately numbered sheets attached hereto.

VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR

Docket Number (Optional)
402-038-19

Applicant or Patentee: David G. McCarthy

Serial or Patent No.: _____

Filed or Issued: _____

Title: Retractable Receptacle For Furniture

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

the specification filed herewith with title as listed above.
 the application identified above.
 the patent identified above.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

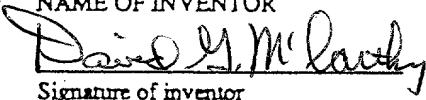
No such person, concern, or organization exists.
 Each such person, concern or organization is listed below.

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

David G. McCarthy
NAME OF INVENTOR


Signature of inventor
10-10-97

Date

NAME OF INVENTOR

Signature of inventor
Date

NAME OF INVENTOR

Signature of inventor
Date

FIGURE 1

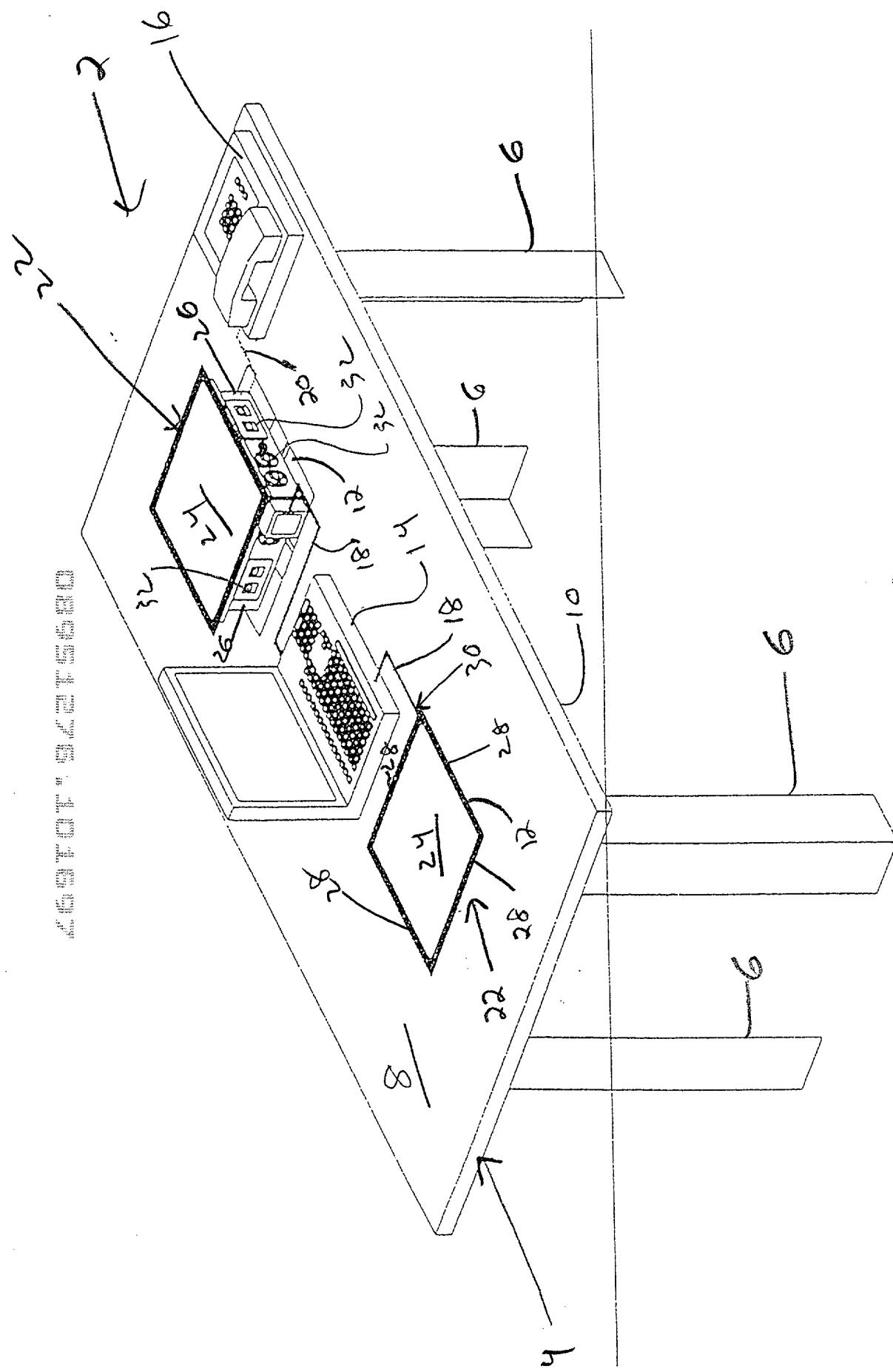


FIGURE 2

